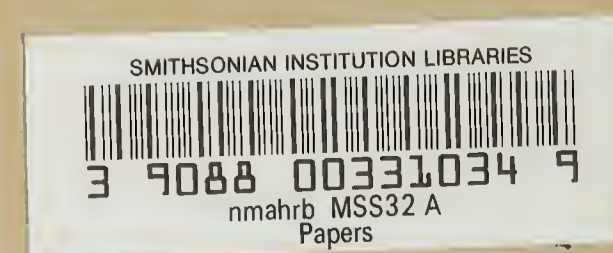


Babbage, Charles (1792-1871)

MSS 32 A RE NMIAH





My dear Mr Pollock.

I cannot resist  
the temptation to join you  
in your visit to the Eng<sup>n</sup>.

I fear I shall be obliged  
to leave you at an early  
hour as I am scarcely  
able to stand from the  
fatigue I have lately undergone.

So on Sat<sup>d</sup> at 2 PM I  
make the exp<sup>t</sup>.

Yours  
March 1<sup>st</sup>  
28 Aug 1862

Ever sincerely yours  
C Babbage

*[Faint, illegible handwritten text, possibly bleed-through from the reverse side of the page.]*

ADMIT  
TO THE  
COLLEGE MUSEUM

R. J. M. Battye

Winter Session } R. J. M. Battye  
1832 } Every day —

~~Days of admission Wednesday & Saturday.~~

DSI

My dear Sir

I have just returned from Devonshire and find your note of the 12<sup>th</sup>. I have much pleasure in accepting your invitation for dinner on Tuesday week the 24<sup>th</sup>. I am very faithfully

Yours &c

J. B. Esq.

Sunday 22 Feb 1835



My dear Sir,

Mr Head desires  
me to inform you that  
he goes to Paris tomorrow  
and that any thing he can  
take for you should be left  
at Marshall Thompson's  
Hotel by 1 o'clock (Cavendish St)

I send a parcel to him  
at eight this evening and  
will forward any thing from  
you which arrives before that  
hour — Yours faithfully

London  
Monday 14 Dec

1829

C Bulmer

DSI

11/6

My dear Sir

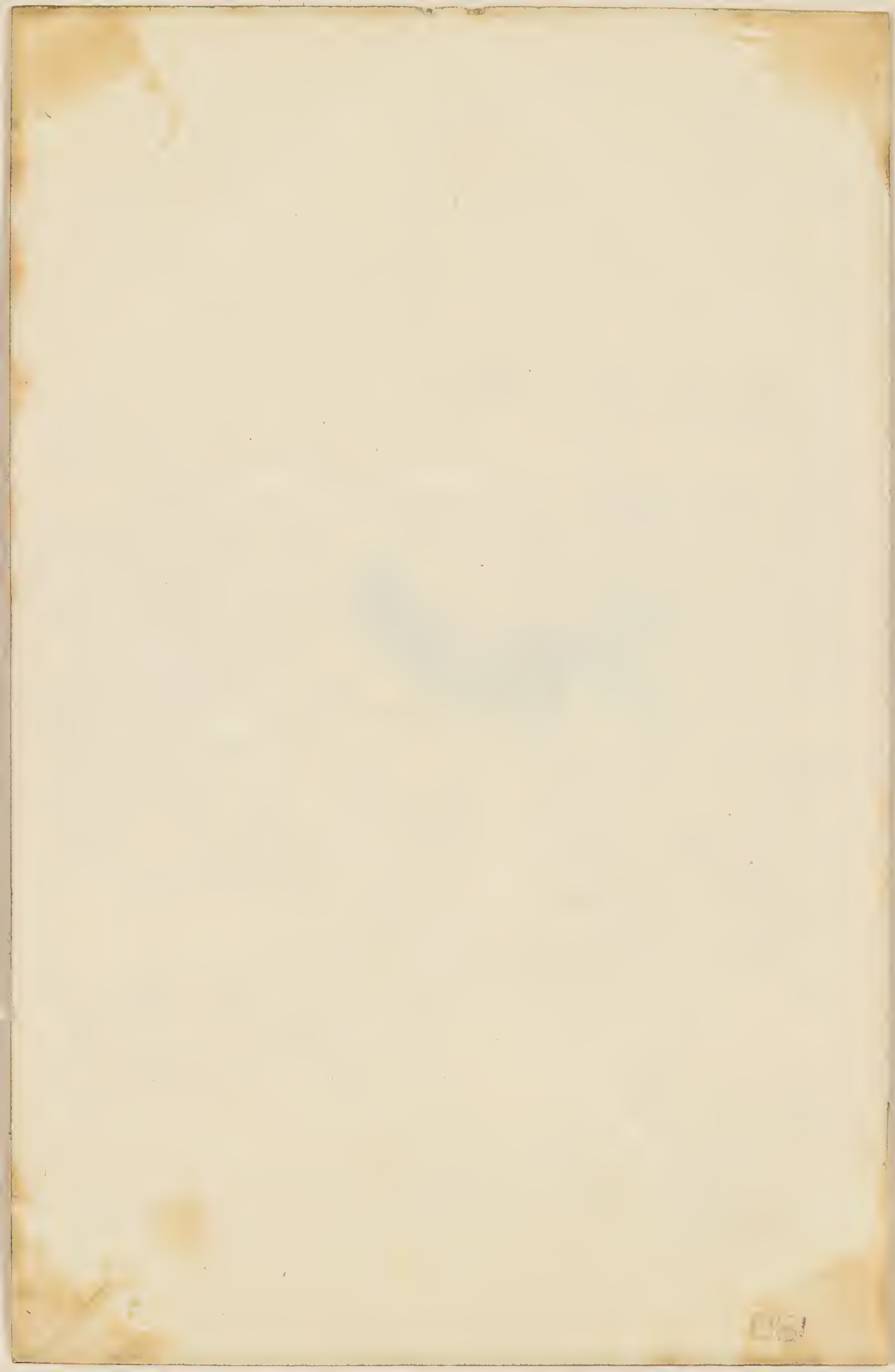
I have read  
- certainly mislaid your  
note which has just re-  
- appeared and explains the ap-  
- peal of the pamphlet

I am so engaged at present  
that I fear it will be quite  
out of my power to receive  
a visit from Dr. Boyer, un-  
- till after my return

Yours truly  
J. B. Bage

Direct to  
March 11

17 July June, 1833



My Dear Sir

Can you favor  
me with a card for  
the Com. Meeting (Anniver-  
sary) of the Civil Engineers  
for next Tuesday for  
my son Mr Herschel  
Babbage. I trouble

you with this note  
but Mr Cubitt should  
be absent. A

card addressed to him  
by post at 1 Dorset  
St March<sup>y</sup> will  
find him

I am  
My dear Sir

Yours truly

G. Babbye

25 May 1850 -

Salvage

Sir,

I usually answer  
by deputy requests  
similar to ~~that~~ which  
I received this morning.

The manner of the  
application and my wish  
to assist, even in the smallest  
degree, <sup>are</sup> any who has

himself worked seriously  
in making any collection  
induces me to make the  
present  
exception.

I enclose you the  
autograph of my secret-  
ary. It is the usual  
and the true reply to  
multitude of enquiries  
from the form of my  
hand writing to the  
shape of the Lunar  
clouds. I am, however,  
your very Obedt Servt  
C Babbage  
Dorset St.  
March 1<sup>st</sup> 1843  
18 Dec 1843

Dear Sir

I have taken some pains to search for Freedygold on the Steam Engine but without success: indeed after I had seen my son (who as I wrote to you before remembered it being sent back shortly after you were so good as to lend it) I had no expectation of finding it. I have however made the attempt and have little doubt that it was returned at the time.

I am, Dear Sir  
Yours faithfully  
C. Babbage

Done by  
March 17  
25 June. 1835

22.20

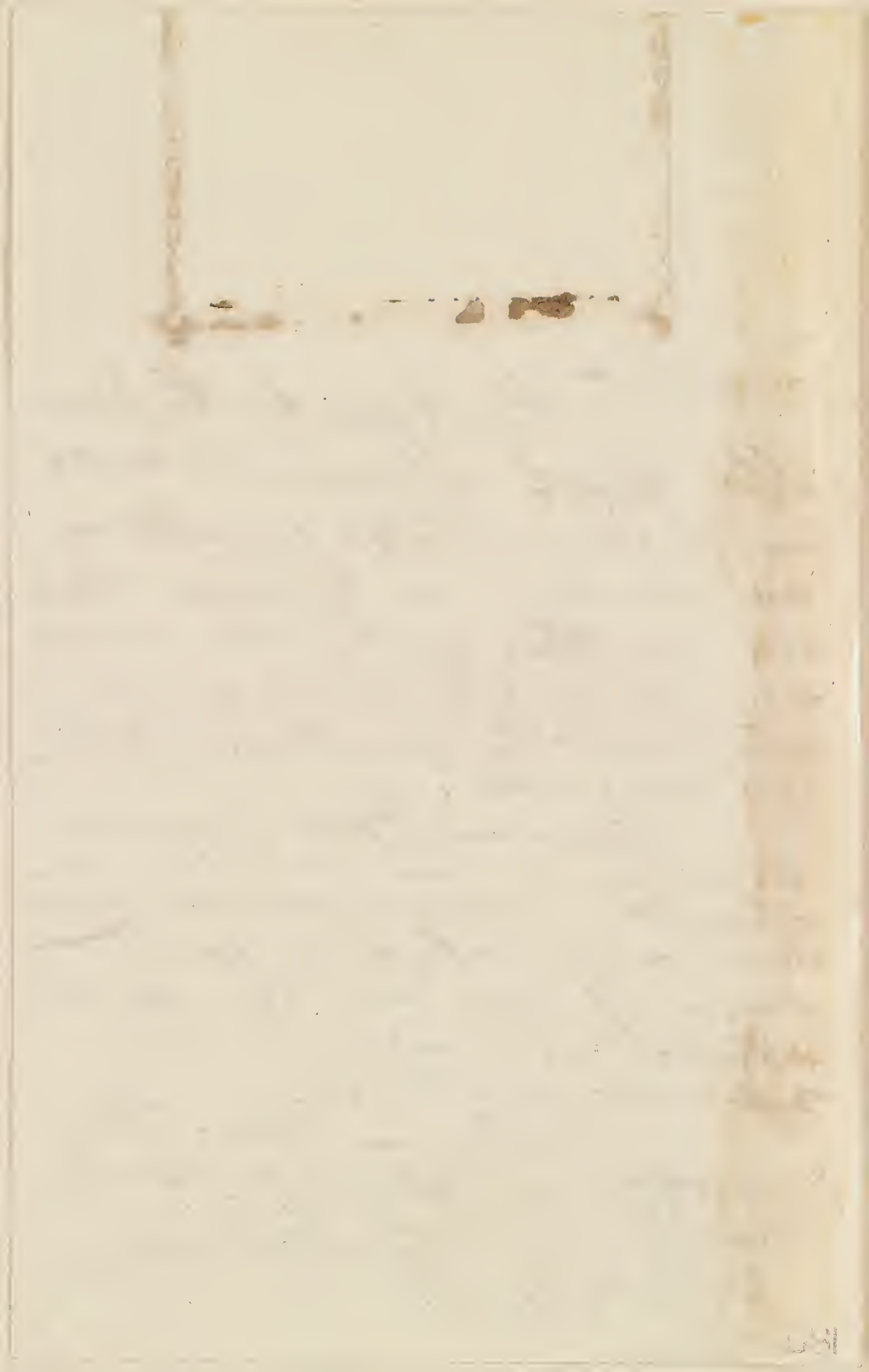


Dear Sir, Thank you for the paper  
sent, though I have not much  
time to spare whilst engaged in  
constructing an Engine which  
will multiply together two numbers  
each having fifty places of figures  
and print the result in less than  
one minute.

Your anecdote about  
Hipparchus is in substance  
correct. Amongst his papers  
there may perhaps be found  
some of my writings for we  
disputed in writing many  
difficult questions.

I am Dear Sir,  
Yours faithfully,  
C. Babbage

23 Feb. 1863



Ballou's  
Catechism

27  
200

Dear Mr. McClure

I have scarcely left  
London for a week during  
the last three years.

The recent disappoint-  
ment which has stopped  
my work at least for the  
present will enable  
me to avail myself  
for a few days of your  
kind invitation. I will  
join your party at Parkley  
by one of the afternoon trains  
but not leaving by me a bit  
I must get one before I can  
reside the hour with budget  
regard to your husband & yours  
Sincerely yours  
Edw. Ballou

Don't forget to write to me  
27 Dec 1853



101  
My Dear Mr Benjamin

Your kindness-  
-tion followed me into  
the country. I was  
fairly driven away from  
London by absolute inca-  
-pacity for work. I  
have fortunately been able  
to have occupation for  
my people during several  
weeks and I am studying  
the art of idleness with

some kind friends who  
are as uneducated as  
myself in that great  
art.

I am perched  
on a shelf just 200 feet  
above the sea in one  
of the most indescrib-  
able of villas. The lawn  
and terraces supported by  
buttresses - horizontal  
walks on the side of a  
steep hill and plenty  
of woods to ramble in  
and a great earth slip  
to philosophise about  
a submarine forest in

front which I intend when  
spring tides admit to examine  
carefully (with a telescope)

All this makes me sleep  
wonderfully and will I  
hope turn out to be repro-  
ductive labor in the end.

I will however  
prevent me from availing  
myself of your kind in-  
vitation - as I shall  
scarcely leave the west  
untill I have given  
it a fair trial  
Ever my dear Mr. May

Sincerely yours

Ashley Grove C. P. Bage  
Portsmouth Somersetshire  
Sep 1848

Mat. Egle Cox  
Baker Street

58 With a model.

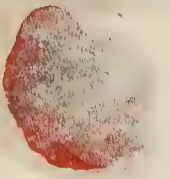
My dear Sir

I return Sir. Gallie  
machine which I am not  
aware I had expressed a wish  
for me — I fear the process  
of spelling which it seems to  
require will render it useless  
in application

Yours truly  
J. H. H. H.

Donec

13 May 1834



*Handwritten text, likely a signature or title, appearing in the upper left quadrant of the page.*

*Faint, illegible handwritten text covering the left side of the page, possibly a letter or document body.*

*Faint, illegible handwritten text appearing in the middle right section of the page.*

C. Babbe Aug 2 1835



1835

My Dear Sir, I can scarcely fancy that I am addressing this letter, It will not say to a stranger, but to a friend whose person I have not yet seen. The unaffected simplicity of your son's character whilst it won my esteem also injured me with a high respect for those who had formed it and I occasionally indulge myself in imagining your domestic circle and fancying the remarks of my young friend on the persons and the things of our older world. I know well from your son's anxiety to study the calculating Engine that I can scarcely write to you on a topic of greater interest nor will I attempt to conceal my own opinion of the importance it now possesses in ~~my own estimation~~ ~~our estimation~~. But I must commence by informing you that I speak of an entirely different Engine from that which your son is acquainted with.

Shortly after he left England in September last I got possession of the drawings of the old Engine which I had not seen for two years. — In

explaining these to my Son many new  
views struck me and a totally new  
and more extensive arrangement occur-  
red to me which appeared of such im-  
portance that I thought it worth while  
before I proceeded to reexamine every  
part of the old Engine I soon found  
many new modes of adding, of carrying,  
and performing other processes which  
were mechanically much more simple  
than the ancient methods. These sim-  
plifications enabled me to add new  
powers to the Engine and yet to make  
it upon the whole less complicated than  
the former one. — It is somewhat  
curious that in the Engine I am now  
drawing there scarcely occurs a single  
contrivance which has been used in the  
former one. — for example In the old engine  
when addition takes place a memorandum  
is made by the transit of a lever from one  
side to the other of a wheel in order to  
indicate that a ten is to be carried — The  
proper arms then pick up these memoranda  
in succession beginning with the carriage to the  
tens then the hundreds &c. — In the new  
engine after addition all the carriages are ef-  
fected at once (at the same instant) the engine  
foreseeing if necessary when a carriage will itself

cause carriage to several miles above  
and acting upon this principle it  
makes any number of them at once.

It is impossible to explain without  
figures this mechanism which is not  
so complicated as the former and which  
is in my opinion one of the happiest  
of the minor contrivances in either  
of the engines.

I have had a drafts-  
man constantly at work since Sept<sup>ber</sup> and  
I have given up all other pursuits for  
the sake of this and the progress I  
have already made surpasses my ex-  
pectation. It is indeed more than I ever  
before made in several years. This  
arises partly from a more enlarged ex-  
perience, partly by having a better  
tempered draftsman, partly by having all  
my drawings in my own house instead of  
at a distance of four miles. My intention  
is to finish a complete set of mechanical  
drawings of the new engine and a variety  
of Mechanical Notations to explain its opera-  
tion. I have already got over all the  
difficulties of the first order and most of those  
of the second and feel very confident that  
in twelve months more if I can carry it  
on I <sup>shall</sup> have that I shall have completed  
the drawings so that the invention can not

4  
could be lost. — I will now give you an  
out line of its power <sup>proving</sup> that ex-  
cept in very peculiar cases the old engine  
(although it worked some complicated eqns  
of finite differences), only added one number  
to another and that it effected its calcu-  
lations only by the artful use of addition.

The new engine will perform the  
following operations absolutely

It will add any number to any other  
— — subtract — — from — —  
— — multiply — — by — —  
— — divide — — by — —

It will at any time reduce any number  
in any part of the engine to zero

It will find any power of any number

It will extract the square root —

It will extract any root by successive  
approximations.

In the engine I am drawing each number  
or variable may have thirty places of figures  
and about 140 variables may be put into  
it at one time. — I have chosen so large a  
number of variables because it enables me to put  
~~into~~ <sup>the</sup> table of lives, wholly into the Engine and also  
the rate per cent and to calculate the values of  
any ann. as one two or three lives for all differences  
of age

The engine will find the numerical value<sup>5</sup> of any algebraic function of any number of quantities for ex. let  $a, b, c, d, \dots$  be given quantities it will calculate and print the value of  $a'$ .

$$a' = f(a, b, c, d, \dots)$$

it will also find that of  $b'$

$$b' = f_1(a, b, c, \dots)$$

$$c' = f_2(a, b, c, \dots)$$

$\& \dots$

and having printed these it will without any new setting reduce  $a, b, c, \& \dots$  to zero and substitute in their places  $a', b', c', \&$  and proceed to find the values of  $a'', b'', c'' \& \dots$

and substituting these proceed to the values of  $a''', b''', c''' \& \dots$  and so on printing each set

Of course it can calculate the values of  $\pi, e$ , the numbers of Bernoulli  $\& \dots$

Also it can calculate any logarithm or any difference of any logarithm or sum any converging series provided an algebraic relation exist between any number of successive coefficients

If the general term of a series be  $(-1)^n \frac{a + bn + cn^2 + \dots}{a' + b'n + c'n^2 + \dots} \frac{p n^i}{r n^{i+2}}$

6 It will find its sum

In developing functions if

$$\phi(x) = a + (a' + bx)y + (a'' + b'x + cx^2)y^2 + \dots$$

whenever any <sup>alg.</sup> relation can be found between given numbers of successive coefficients - The engine will calculate and print in succession as many as may be required

If the development be

$$\phi(x) = A + B\psi f_x + C\psi f_x^2 + D\psi f_x^3 + \dots$$

the numerical value of  $A, B, C, D$  may be found under the same conditions

If  $f_x$  be any algebraic function of  $x$  then the Engine will give the numerical values of  $f(x), f^2(x), f^3(x), f^4(x), \dots$  and if well if required make tables of the values of these for any values of  $x$

The engine will print the value of every constant or variable put into it at the commencement <sup>of a calculation</sup> on the same plate on which it prints the calculated result. Thus if the superintendent has put in wrong numbers his error will be detected by comparing those which the Engine prints with those given to him to put into it. - This is a most important power for if any calculations are too complicated <sup>as to require it</sup> or if tables previously printed by

The engine are to be employed & the engine will print every number put in and every calculation made on one piece of copper some of the calculations thus made may again be employed in the Engine for new calculations. But they will be again printed on a second plate of copper with the new results and these new results may be used again and so on — Thus any error committed by the superintendent in putting in the figures will inevitably be detected by comparing the successive plates.

When means of large series of observations are required to be taken according to any law they may be done thus. The superintendent sits before the engine and puts in the first number as soon as it disappears he puts in the 2<sup>nd</sup> then 3<sup>rd</sup> &c.

Now the engine may be set so that it shall print several columns: in the 1<sup>st</sup> the number actually put in will be printed in the second the mean of every two — in the 3<sup>rd</sup> the mean of every three then of every 4 or every ten as may be required.

and at the same time in another part of the engine the curves formed by the obs.<sup>ns</sup> themselves as well as by all the means shall

be engraved on a plate of copper.

You will perceive by the first statement that the whole system of ~~any~~ finite differences is now reduced to wheelwork and that it is only a question of time to arrive at the value of any term.

The calculating part of the engine consists of a Directive part, in which the formula is set - a driving part - and an arithmetical part in which about 140 numbers containing ~~above~~ 4000 figures, are placed. It has scarcely a single spring, in which respect it differs entirely from the former one and it is much simpler - and less liable to wear or get out of order.

You will be able to appreciate the influence of such an engine on the future progress of science. I live in a country which is incapable of estimating it and I am much displeased with the treatment I have experienced. You who have yourself made great pecuniary sacrifices for the production of a great and important work will understand my feelings. I have made large sacrifices and am prepared to

make still larger. There is however a  
limit at which my duty to my children  
demands my forbearance, and I place  
that at the completion of the drawings  
which is in fact the completion the in-  
-ventions. These will remain when

I am gone and when some more en-  
-lightened country than my own  
shall at some future period become  
sensible of ~~the~~ <sup>of the</sup> value, or ambitions of  
the game of calling its into real exis-  
-tence, ~~those~~ <sup>drawings</sup> will undoubtedly be sought  
and from them a machine will be  
made which shall give to all nations  
and to all after time tables at once per-  
-fect and enduring <sup>which shall execute</sup> and calculations from  
which all human agents would shrink  
in hopeless despair.

I have thus  
given you an outline of the work I am employed  
in the views that it has opened and which it  
continually suggests are amongst the most interest-  
-ing and important I have met with.

With my kindest regards to your fair  
Dorset St. I am My dear Sir  
Manchester &c. With great esteem  
London  
2 August 1833  
Yours  
Charles Babbage



BABBAGE, CHARLES. (1792-1871) Mathematician & Inventor.

A.L.S. to Benjamin.

*Fletcher '67*

3pp. 8vo. Porlock: Sept. 6th 1848.

£10/10

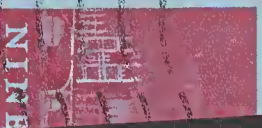
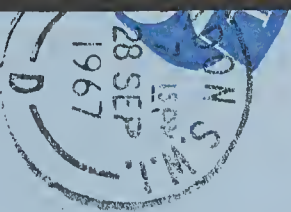
Saying that he could not accept an invitation as he had been driven away from London "by absolute incapacity for work", but he had been able to leave occupation for his people for several weeks while he studied the art of idleness. He describes the villa, and surroundings where he was staying, and a submarine forest which he intended to examine when the spring tides permitted.

Kingham, Gate,

, S.W.1.

BETTER SHOULD NOT COME  
IF IT DOES IT WILL BE  
OR SENT BY ORDINARY MAIL

SECOND FOLD HERE



B. Dibner,

BURNBY, NORMAN  
MAIL ROOM

1792.

1871.

Charles Babbage  
K.H. FRS. M.A.  
Philosophical Writer &  
Mathematician.

He was Born 26<sup>th</sup> Dec<sup>r</sup> 1792. His Father Mr Benjamin Babbage was a Banker, one of the firm of Prace & Mackworth & Babbage, Esq. Mother Betsy Plumley Babbage (nee Teape) both Natives of Tames & connected with well known Devonshire families. When young he was sent for a time to a private school conducted by the Rev<sup>d</sup> Stephen Freeman at Einfeld, Middlesex, from whom he imbibed his intense love of Mathematics. Cap<sup>t</sup> & Married the Novelist was one of his schoolfellows. In consequence of delicate health he was removed from the school & permitted to read with private tutors until he went up to Cambridge.

In 1810 he entered the University of Cambridge, where he took his Bachelors Degree in 1814. He was a Contemporary of Sir John Herschel.

At school & Mr Airey the Astronomer Royal. He was a Professor in this College as Lucasian Professor of Mathematics in 1828 which he held until 1839. He also took his Degree of M.A. whilst at Cambridge. Mr Babbage was one of the Founders of the Astronomical Society & an earnest Promoter of the British Association for the Advancement of Science. His Name has been associated with two things first the famous Calculating Machine & secondly the Organ Grinding Nuisance, which he tried to suppress. Upon which he once observed to a friend "I only prevented the Organ grinder from doing what every one could, but he prevents my doing what no one else can do". Respecting his Calculating Machine. In the first place he constructed a portion of what he called a "Difference Engine" & secondly he demonstrated the possibility of an "Analytical Engine". About 1821, he undertook for the Government the construction of an Engine for calculating & printing Mathematical & Astronomical tables — but early in 1833 after a portion of the Machine was put together circumstances which he could not control caused a temporary suspension. In 1834 he commenced another & far more powerful engine, the former could employ only 120 figures in its calculations, the latter was intended to compute with about 4000. The construction was abandoned in 1842 to the grief & bitter disappointment of the inventor. Government had advanced at different times as much as £17,000 & he had spent upwards of £20,000 out of his private means. The Government were frightened & as he could not state the limit of his probable expenses the affair came to a dead stop. According to the popular notion he was a Man of one idea, but this was far from the truth; indeed there were few branches of Manufacture in which his inventive genius had not suggested some improvements. Mr Babbage was one of the oldest Members of the Royal Society at the time of his death. He was also more than 50 years ago one of the Founders of the "Astronomical Society" & he & Sir John Herschel were the last Survivors of that body. Amongst his various publications including books & smaller treatises, which it is stated extended to the number of 80, he wrote "The Economy of Manufactures & Machinery" (1833); "A Ninth Bridgewater Treatise" (1837); & "Passages from the Life of a Philosopher" (1864); besides contributing largely to the "Transactions of the Royal Society". In November 1832, Mr Babbage became a candidate for the Representation of Hensbury, declaring himself to be in favor of Parliamentary & fiscal Reform, the abolition of sinecures, triennial parliaments & vote by ballot. In after life he married Miss Whitmore of Dulwich. He died on the 18<sup>th</sup> October 1871 at 1 Dorset Street, Manchester Square in the 80<sup>th</sup> year of his age.

Lady Beaufort & Emma  
Mrs. Norton & Arthur  
Mrs. Woodcock & Frederick  
Lemon



# AUTOGRAPHE

de

*Babbage*

*Charles.*

## OBSERVATIONS

**BABBAGE** (CHARLES, 1792-1871). Mathematician and Scientific Mechanician.

AUTOGRAPH LETTER SIGNED.

1 page, 8vo. Dorset Street, 17th June, 1833.

11s 6d

" . . . I am so engaged at present that I fear it will be quite out of my power to receive a visit from Dr. Borgeri until after my return from Cambridge." Etc.

### CALCULATING MACHINE.

**BABBAGE** (CHARLES, 1792-1871). Mathematician and Scientific Mechanician.

AUTOGRAPH LETTER SIGNED.

9 pp., 4to. London, 2nd August, 1835.

£5 5s

A very lengthy letter entirely on the structure of his calculating machine.

In 1823 work was commenced upon a calculating machine, invented by Babbage, but in 1842 was abandoned on the ground of excessive and indefinite expense, having cost £17,000 of public money, besides about £6,000 of the inventor's private means.

" . . . I know well from your son's anxiety to study the Calculating Engine that I can scarcely write to you on a topic of greater interest nor will I attempt to conceal my own opinion of the importance it now possesses. But I must commence by informing you that I speak of an entirely different Engine from that which your son is acquainted with.

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**Babbage** (fr. babbidj), Charles, Mathematiker, geb. 26. Dez. 1792 (1791) zu Teignmouth in Devonshire, gest. 20. Okt. 1871, studierte auf dem Trinity College zu Cambridge, war 1828-39 daselbst Professor der Mathematik und lebte dann als Privatgelehrter in London. Er gab heraus: »Tables of logarithms« (neueste Ausg., Lond. 1839) und »Comparative view of the different institutions for the assurance of lives« (daf. 1826; deutsch, Weim. 1827). Die Schwierigkeit, größere Tabellenwerke korrekt herzustellen, brachte B. auf den in dem »Letter to Sir H. Davy on the application of machinery to mathematical tables« (1822) entwickelten Gedanken einer Rechenmaschine (s. d.), die zugleich drucken sollte. Ein Verzeichniss seiner sämtlichen Schriften (gegen 80) enthält Welchs »History of the Royal Society«, Kap. 11 (Oxford 1848).







